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THE ANALYSIS OF THE SENSATIONS.

ANTIMETAPHYSICAL.

I.

THE great results that physical research in the last centuries has achieved, not only in its own domain, but also, by the assistance it has afforded, in the domain of other sciences, have brought it about that physical ways of thinking and physical methods of procedure have everywhere attained to especial prominence, and that the greatest expectations are associated with their employment. In conformity with this drift of modern research the physiology of the senses, gradually leaving the paths that had been entered upon by men like Goethe, Schopenhauer, and others, but especially with the greatest success by Johannes Müller, has also almost exclusively assumed a physical character. This tendency must appear to us as not exactly the proper and the desirable one, when we reflect that physics despite its considerable development nevertheless constitutes but a *portion* of a greater collective body of knowledge, and that it is incompetent with its limited intellectual methods, created for especial and limited purposes, to exhaust the entire material of the province now under consideration. However, without renouncing the support of the science of physics, it is possible for the physiology of the senses not only to continue its own special development, but also to afford physical science itself valuable assistance. The following simple considerations will serve to illustrate this relation.

II.

Colors, sounds, temperatures, pressures, spaces, times, and the like, are united with one another in the most manifold ways; and to these are joined moods of mind, feelings, and wills. Out of this complication, that which is relatively the more fixed and the more permanent stands prominently forth, engraves itself in the memory, and expresses itself in language. As relatively more permanent appear, first, *complexes* of colors, sounds, pressures, and so forth, that are connected in time and space, that therefore receive special names, and are designated as *bodies*. Such complexes are by no means absolutely permanent.

My table is now brightly and now darkly lighted. It may be warmer or colder. It may receive an ink stain. One of its legs may get broken. It can be repaired, polished, and replaced part for part. But for me, amid all, it remains the table at which I daily write.

My friend can put on a different coat. His countenance can assume a serious or joyful expression. The complexion of his face, under the effects of light or of emotion, can change. His shape can be altered by a movement, or can be permanently transformed. But the sum total of the permanent, as compared with gradual alterations of this kind, always remains so great, that the latter vanish. It is the same friend with whom I take my daily walk.

My coat can receive a stain, a tear. The very manner of my expression indicates that the gist of the thing is a quantity of permanency, to which the new element is added and from which that which is lacking is subsequently deducted.

Our greater intimacy with this quantity of permanency, and its preponderance as contrasted with the changeable, impel us to the partly instinctive, partly voluntary and conscious economy of mental representation and designation which is expressed in ordinary thought and speech. That which has been *once* perceptually represented receives a *single* designation, a *single* name.

As relatively permanent, is exhibited, further, that complex of memories, moods, and feelings, joined to a particular body (the

human body), which is denominated the "I" or "Ego." I can be engaged with this subject or with that subject, I can be quiet or animated, excited or ill-humoured. Yet—pathological cases not considered—enough that is permanent remains to recognise the ego as the same. Moreover, the ego also is only of relative permanency.

* * *

The apparent permanency of the ego consists pre-eminently in the fact of its *continuity*, and in its slow change. The many thoughts and plans of yesterday that are continued to-day, and of which our environment in waking hours continually reminds us (and therefore in dreams the ego can be very indistinct, doubled, or entirely wanting), and the little habits that are unconsciously and involuntarily kept up for longer periods of time, constitute the fundamental root of the ego. There can hardly be greater differences in the ego of different people, than occur in the course of years in *one* person. When I recall to-day my early youth, I should take the boy that I then was, with the exception of a few single features, for a different person, did not the chain of memories that make up my personality now lie before me. Many a treatise that I myself wrote twenty years ago, now makes upon me a very strange impression. The very gradual character of the changes of the body also contributes to the permanency of the ego, but in a much less degree than people imagine. Such things are much less analysed and noticed than the intellectual and the moral ego. Individually, personally, people have a very poor knowledge of themselves.

Once, when a young man, I espied in the street a face in profile that was very displeasing and repulsive to me. I was not a little taken aback when a moment afterwards I found that it was my own, which, in passing by a place where mirrors were sold, I had perceived reflected from two mirrors that stood at the proper inclination to each other.

Not long ago, after a trying railway journey by night, being much fatigued, I got into an omnibus just as another gentleman appeared at the other end. "What degenerated pedagogue is that, who has just entered," thought I. It was myself: opposite me

hung a large mirror. My ordinary dress, accordingly, was more familiar to me than my travelling attire.

The ego is as little absolutely permanent as bodies. That which we so greatly fear in death, the annihilation of our permanency, actually occurs in life in abundant measure. That which is most valued by us, remains preserved in countless copies, or, in cases of exceptional excellence, as a rule preserves itself. In the best human being, however, there are individual traits the loss of which neither he himself nor others need regret. Indeed, at times, death, viewed as liberation from individuality, can even become a pleasant thought.

* * *

After the first survey has been obtained, by the formation of the concepts of substance, "body" "ego" (matter, soul), the will is impelled to a more exact examination of the *changes* that take place in this relatively permanent existence. The changeable element in bodies and in the ego, indeed, is the very thing that moves the will. Now, for the first time, do the constituent elements of the complex stand forth as properties of the same. A fruit is sweet; but it can also be bitter. So, too, other fruits can be sweet. The red color that is sought is found in many bodies. The neighborhood of some bodies is pleasant, that of others unpleasant. Thus, gradually, do different complexes appear to be composed of common constituent elements. The visible, the audible, the tangible, are separated from bodies. The visible is broken up into color and into form. Out of the manifold constitution of colors issue, again, in lesser numbers, certain other constituent elements—the primary colors, and so forth. The complexes are disintegrated into *elements*.

III.

The proper and useful habit of designating that which is permanent by a *single* name, and of comprehending the same in a *single* thought, without analysing at each operation its constituent parts, is liable to come into singular conflict with the tendency to separate these constituent parts. The obscure image formed of the permanent, which does not perceptibly change when one or another constituent part is taken away, appears to be something existent *by itself*.

Inasmuch as it is possible to take away *singly* every constituent part without effecting the capacity of the image formed to *represent* the totality involved, or effecting its subsequent recognition, it is imagined that it is possible to take away *all* these parts and yet have something remaining. Thus arises the monstrous idea of a *thing of itself*, different from, and incognisable with relation to, its "phenomenal" existence.

Thing, body, matter, are nothing apart from this complex of colors, sounds, and so forth—apart from their so-called marks, or characteristics. That Protean, illusory philosophical problem of a *single* independent thing with *many* properties, arises from the misunderstanding of the fact, that extensive comprehension and accurate separation, although both are temporarily justifiable and profitable for a number of purposes, can not and must not be employed *simultaneously*. A body is *single* and unchangeable so long as it is not required to take details into consideration. Thus both the earth and a billiard ball are *spheres* so long as we disregard all minor deviations from the spherical form, and greater exactitude is not necessary. But if we are compelled to carry on investigations in orography or microscopy both bodies cease to be spheres.

IV.

Man possesses in pre-eminence the power to determine arbitrarily and consciously his point of view. He can at one time disregard the most salient features, and immediately afterwards take into account the smallest trifles; now regard a current of electricity as fixed, without consideration of its contents, and now determine the width of a Fraunhofer line in the solar spectrum; he can rise, at will, to the most general abstractions, or bury himself in the minutest particulars. The animal possesses this capacity in a much less degree. It does not assume a point of view, but usually is brought to it by impressions. The baby that does not recognise its father with his hat on, the dog that is perplexed at the new coat of its master, have succumbed in the conflict of points of view. Who has not been thus worsted in similar cases? Even the man of phi-

losophy at times succumbs, as the fantastic problem above referred to, shows.

Indeed, do not certain circumstances actually appear to furnish a justification of that problem? Colors, sounds, the odors of bodies are evanescent. But the tangible part, as a sort of constant, durable nucleus, not easily liable to annihilation, remains behind; appearing as the vehicle of the more fugitive properties annexed to it. Habit firmly affixes our thought to this central nucleus, even where the knowledge has found its way, that seeing, hearing, smelling, and *touching* are intimately akin in character. Added to this, also, comes the fact, that in consequence of the singularly extensive development of mechanical physics a kind of *higher reality* is ascribed to Space and Time than to colors, sounds, and odors. Agreeably to which, the junction in space and time of colors, sounds, and odors appears *more real* than colors, sounds, and odors themselves. The physiology of the senses, however, demonstrates, that spaces and times can with as much justice be termed sensations, as colors and sounds.

v.

Also the ego, as well as the relation of bodies to the ego, occasions the rise of analogous seeming-problems, the character of which may be briefly presented in the following manner.

The complexes of colors, sounds, and so forth, that are commonly called bodies, we shall designate for the sake of simplicity by $A B C . . .$; the complex that is known as our own body, and which constitutes a part of the former, we shall call $K L M . . .$; the complex composed of volitions, memory-images, and the like, we shall represent by $\alpha \beta \gamma$. Usually, now, the complex $\alpha \beta \gamma . . . K L M . . .$ is opposed as ego, to the complex $A B C . . .$ regarded as world of substance; sometimes, too, $\alpha \beta \gamma . . .$ is comprehended as ego, and $K L M . . . A B C . . .$ comprehended as world of substance. Now $A B C . . .$ first appears as independent of the ego. But this independence is only relative, and gives way before closer inspection. Much, it is true, may change in the complex $\alpha \beta \gamma . . .$ without much becoming noticeable in $A B C . . .$; and so *vice versa*. But many changes in $\alpha \beta \gamma . . .$ pass, by way of changes in $K L M . . .$,

over to $A B C \dots$; and *vice versa*. (As, for example, when vivid ideas break forth into acts, or our environment brings about perceptible changes in our body.) At the same time $K L M \dots$ appears to be more closely connected with $\alpha \beta \gamma \dots$ and $A B C \dots$ respectively, than the latter do with one another; relations that find their commonest expression in thought and speech.

Closely examined, however, it appears that $A B C \dots$ is *always* determined with and by $K L M$. A die, when seen close at hand, looks large; when seen at a distance, small; it looks different with the right eye from what it does with the left; sometimes it appears double; with closed eyes it is invisible. The properties of the same body, therefore, appear as modified by our own body; they appear as conditioned by it. But where, pray, is this *same* body that phenomenally appears so *different*? All that can be said is, that different $A B C \dots$ are annexed to different $K L M$.*

We see an object with a point S . If we touch S , that is bring it into relation with our body, we receive a prick. We can see S , without feeling the prick. But as soon as we feel the prick we find S . The visible point therefore is a *permanent fact* or *nucleus*, to which the prick is annexed, according to circumstances, as something accidental. From the frequency of occurrences analogous to this we ultimately accustom ourselves to regard *all* properties of bodies as "effects" proceeding from permanent persistent nuclei and conveyed to the ego through the mediation of the body; which effects we call *sensations*. By this very operation, however,

* I expressed this thought many years ago (in the *Vierteljahrsschrift für Psychiatrie*, Leipzig and Neuwied, 1868: *Ueber die Abhängigkeit der Netzhautstellen von einander*) as follows: The expressions "sense-deception" and "illusion of the senses" prove, that we are not yet fully conscious, or at least that we have not yet found it necessary to incorporate this consciousness into our ordinary terminology, *that the senses represent things neither wrongly nor correctly*. All that can be truly said of the sensory organs is, that, *under different circumstances they produce different sensations and perceptions*. Since these "circumstances" are of so extremely manifold a character, being partly external (inherent in the objects), partly internal (inherent in the sensory organs), and partly interior (having the seat of their activity in the central organs), it would naturally seem, especially when attention is paid only to external circumstances, that an organ acts differently under like conditions. And it is customary to call the unusual effects, deceptions or illusions.

these imagined nuclei lose their entire sensory content, and become mere mental symbols. The assertion is correct then that the world consists only of our sensations. In which case we have knowledge *only* of sensations, and the assumption of the nuclei mentioned, as well as of a reciprocal action between the same, from which sensations might be supposed originally to proceed, turns out to be wholly idle and superfluous. Such a view can only suit a halting realism or a half-matured philosophic criticism.

VI.

Ordinarily the complex $\alpha \beta \gamma \dots K L M \dots$ is opposed as ego to the complex $A B C$. Those elements only of $A B C \dots$ that more actively alter $\alpha \beta \gamma \dots$, as a prick, a pain, are we accustomed to comprehend in the ego. Afterwards, however, through observations of the kind above mentioned, it appears that the right to annex $A B C \dots$ to the ego at no point ceases. In conformity to which the ego can be so extended as ultimately to comprehend the entire world.

* * *

When I say that the table, the tree, and so forth, are sensations of mine, there is contained in this, as contrasted with the method of representation of the ordinary man, an actual extension of my ego. And so, too, upon the emotional side, such extensions actually occur; as for the virtuoso, who possesses as perfect a mastery of his instrument as he does of his own body; for the skilful orator in whom the eyes of an audience converge, and who controls the thoughts of his hearers; for the energetic politician who directs with ease his party; and so on. In conditions of depression, on the other hand, such as nervous people often have to endure, the ego contracts and shrinks. A wall seems to separate it from the world.

* * *

The ego is not sharply defined, its limits are very indefinite, and arbitrarily displaceable. Only by mistaking this, and by unconsciously narrowing these limits, as well also as by enlarging

them, do metaphysical difficulties, in the conflict of points of view, arise.

As soon as we have recognised that the supposed unities "body" and "ego" are only make-shifts for a *provisional* survey and for certain practical ends (that we may apprehend bodies, protect *ourselves* from pain, and so forth), we are obliged, in many thorough-going scientific investigations, to abandon them as insufficient and inappropriate. The opposition between ego and world, sensation (or phenomenon) and thing, then vanishes, and we are brought to deal simply with the *connection and relation of the elements* $\alpha \beta \gamma \dots A B C \dots K L M \dots$, for which indeed this very opposition was only a partially appropriate, imperfect expression. This connection is nothing more than the combination of those elements with other homologous elements (time and space). This connection science has simply to *accept*, and set itself aright with regard to it, without attempting to explain its existence.

Upon superficial examination the complex $\alpha \beta \gamma \dots$ appears to consist of much more *evanescent* elements than $A B C \dots$ and $K L M \dots$, in which two last the elements appear to be joined with *more stability* and *in a more permanent manner* (being joined to solid nuclei as it were). Although upon closer inspection the elements of all complexes appear as *homologous*, yet even in spite of the recognition of this fact, the ancient notion of an opposition of body and spirit easily creeps in. The spiritualist feels, at times, the difficulty of imparting the necessary solidity to his world of substance created by mind: the materialist is at a loss what to do when called upon to animate and endow with sensation the world of matter. The *monistic* point of view that reflection and reason have evolved, is easily overcast by the older and more powerful instinctive notions.

VII.

The difficulty described is especially felt in the following considerations. In the complex $A B C \dots$, which we have designated as the material world, we find as part, not only our own body $K L M \dots$, but also the bodies of other persons (or animals) $K' L' M'$

... , $K'' L'' M''$... , annexed to which, after the analogy of the complex $\alpha \beta \gamma$... , we conceive similar $\alpha' \beta' \gamma'$... , $\alpha'' \beta'' \gamma''$. As long as we deal with $K' L' M'$... , we find ourselves in a thoroughly familiar province, at every point sensorially accessible to us. But when we inquire after the sensations or feelings that belong to the body $K' L' M'$... , we no longer find in the province of sense the elements we seek: but we add them in thought. Not only is the domain into which we now enter much less familiar to us, but also the transition to it is relatively unsafe. We are possessed of a feeling as if we were about to plunge into an abyss. They that always pursue this direction of thought and this direction *only*, will never get completely rid of the feeling of insecurity that is very productive as a source of apparent problems.

But we are not limited to this way of reasoning. Let us consider first the reciprocal relation of the elements of the complex $A B C$... , without regarding $K L M$... (our body). Every physical investigation is of this kind. A white bullet falls upon a bell; a sound is heard. The bullet turns yellow before a sodium lamp, red before a lithium lamp. Here the elements ($A B C$...) appear to be connected only *among each other* and to be independent of our body ($K L M$...). But if we take santonine the bullet turns yellow again. If we turn one eye sidewise we see two bullets. If we close our eyes entirely we see no bullet at all. If we sever our auditory nerve no sound is heard. The elements $A B C$... , therefore, are not only connected among each other, but also with $K L M$. To this extent and to this extent *only* do we call $A B C$... *sensations*, and regard $A B C$... as belonging to the ego. In this way, accordingly, we do not meet with the gap between bodies and sensations before described, between that which is without and that which is within, between the material and the spiritual world.* All elements $A B C$... $K L M$... constitute but *one single* coherent mass, which when any one element in it is disturbed *all* is put in motion; except that a disturbance has a more

* Compare my *Grundlinien der Lehre von den Bewegungsempfindungen*. Leipsic. Engelmann, 1875, p. 54.

extensive and profound action in *K L M . . .*, than in *A B C*. A magnet in our neighborhood disturbs the particles of iron near it; a falling boulder shakes the earth; but the severing of a nerve sets in motion the *entire* system of elements. Quite involuntarily does this relation of things suggest the picture of a viscous mass, at certain places (as in the ego) more firmly coherent than at others.

* * *

When I first came to Vienna from the country, as a boy four or five years of age, and was taken by my father upon the walls of the city's fortifications, I was very much surprised to see people below in the moat and could not understand how, regarded from my point of view, they could have gotten down there; for the thought of another possible way never occurred to me. I remarked the same amazement, once afterwards in life, in the case of a three-year old boy of mine, while taking a walk with him upon the walls about Prague. I recall this feeling to mind every time I engage myself with the reflection above referred to, and I frankly confess that this accidental experience of mine greatly helped to strengthen the opinion upon this point that I adopted a long time ago. The habit of pursuing the same ways in material and psychical things operates to confuse greatly our field of survey. A child forcing its way through a wall in a house in which it has long dwelt, can experience an actual enlargement of its view of the world, and a slight scientific hint can bring much enlightenment.

VIII.

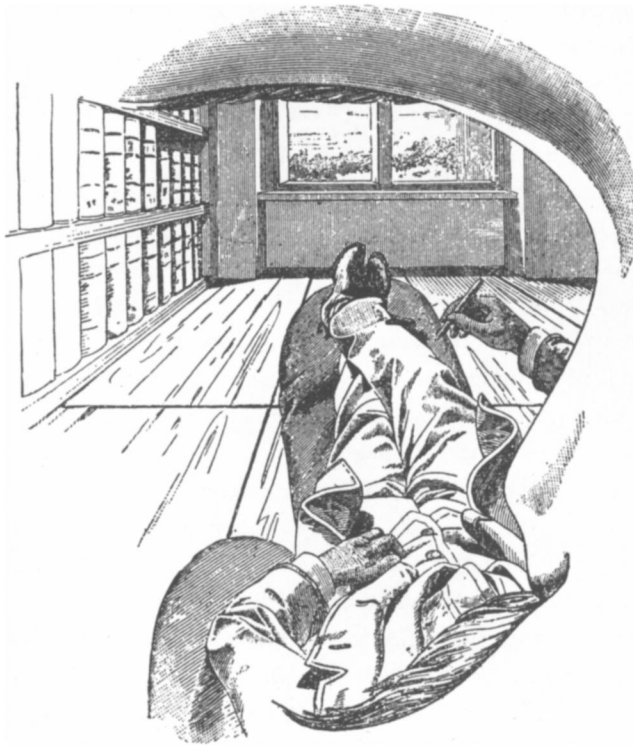
Accordingly, the great chasm between physical and psychological research exists only for the common stereotyped method of observation. A color is a physical object when, for example, we regard its dependence upon its luminous source (upon other colors, upon heat, upon space, and so forth). Regarding however its dependence upon the retina (the elements *K L M . . .*), it becomes a psychological object, a sensation. Not the subject-matter, but the direction of our investigation is different in the two domains.

When, from the observation of the bodies of other men or animals, we infer their sensations, as well also as when we investigate

the influence of our own body upon our own sensations, we are forced to complete observed facts by analogy. This work of completion by analogy is done with much more accuracy and facility, when it relates, let us say, to nervous processes, which cannot be fully observed in our own bodies—that is when it occurs in the more familiar physical domain—than when the completion relates to psychical processes. Otherwise there is no material difference.

IX.

The thoughts presented gain greatly in fixity and vividness if in addition to simply expressing them in abstract form we bring ourselves face to face with the facts from which they arise. For



example, I lie upon my sofa. If I close my right eye the picture represented in the accompanying cut is presented to my left eye. In a frame formed by the ridge of my eyebrow, by my nose, and by

my moustache, appears a part of my body, so far as it is visible, and also the things and space about it. *My* body differs from other human bodies—leaving out of account the fact that every vivid motory idea immediately passes into movement and that contact with it determines more perceptible changes than contact with other bodies—by the circumstance, that it is only partly seen, and, especially, is seen without a head. If I observe an element *A* within my field of vision, and investigate its connection with another element *B* within the same field, I go out of the domain of physics into that of physiology or psychology, if *B*, to use the apposite expression that a friend* of mine employed upon seeing this drawing, passes through my skin. Reflections like that for the field of vision may be made with regard to the province of touch and the perceptual domains of the other senses.

x.

Reference has already been made to the different character of the groups of elements that we have designated by *A B C . . .* and $\alpha \beta \gamma$. As a matter of reality, when we *see* a green tree before us, or *remember* a green tree, that is *conceive* a green tree to ourselves, we know right well how to distinguish these two cases. The imaged tree has a much less determinate, a much more changeable form; its green is much paler and more evanescent; and, what is of especial note, it distinctly appears in a *different* sphere. A movement that we *propose* to execute is always only a *conceived* movement, and appears in a different field or sphere from that of the executed movement, which moreover always takes place where the image becomes vivid enough. The statement that the elements *A* or α appear in a different sphere, means, if we go to the bottom of it, nothing more than that they are united with divers other elements. To this extent, accordingly, the *basal component parts* in *A B C . . .*, $\alpha \beta \gamma . . .$ would be *the same* (colors, sounds, spaces, times, motory sensations, innervations . . .), and only the character of their union different.

* J. Popper of Vienna.

Pain and pleasure are ordinarily regarded as different from sensory sensations. Yet not only tactile sensations, but also all other kinds of sensations, can gradually pass into pleasure and pain. Pleasure and pain can also justly be called sensations. Only they are not so well analysed and so familiar as sensory sensations. Sensations of pleasure and pain, however faint the mode of their appearance, make up indeed the real content of all so-called feelings. Thus perceptions, as well as ideas, volition, and feelings, in short the entire inner and outer world, are composed of a small number of homologous elements united in relations now more evanescent and now more lasting. These elements are commonly called sensations. But since vestiges of a one-sided theory now inhere in this term, we prefer to speak simply of *elements*, as we have already done. All research aims at the resolution of the union of these elements.*

XI.

That out of this complex of elements which at bottom is simply *one*, the limits of bodies and the ego do not admit of being fixed in a manner certain and sufficient for all cases, has already been said. The composition of the elements, intimately connected with pleasure and pain, into an ideal mental-economical unity, the ego, is a work of the highest significance for the intellectual functions that act in the service of the pain-avoiding, pleasure-seeking will. The formation of the ego by this process of circumscription and delimitation is therefore instinctively effected, it grows familiar and natural, and fixes itself perhaps through heredity. By their high *practical* value, not only for the individual, but also for the entire race, the composites "ego" and "body" instinctively assert their existence, and operate with the power of original elements. In *special* circumstances, however, in which practical ends are not concerned, but knowledge becomes an object in itself, this delimitation often turns out to be insufficient, obstructive, and untenable.

* Compare the remarks appended to my treatise: *Die Geschichte und die Wurzel des Satzes der Erhaltung der Arbeit*. Prague. Calve, 1872.

Professional *esprit de corps*, and even professional bias, the sentiment of nationality, the most narrow-minded local patriotism may also have a high value, for certain *purposes*. But such conceptions will not characterise the far-sighted investigator, at least not in the moment of research. All these egoistic conceptions are adequate for practical purposes only. Of course, even the investigator can succumb to custom. Trifling scholastic fiddle-faddle, the cunning appropriation of others' labor and perfidious silence with regard to it, the numerous objections and complaints when unavoidably compelled to give recognition, and the scanty illumination of others' performances on such occasions, abundantly show that the scientist and scholar have also to fight the battle of existence, that the ways of science yet lead to the mouth, and that the *pure* quest of knowledge amid our present social relations is still an ideal.

* * *

The primary fact is not the *I*, the ego, but the elements (sensations). The elements *constitute* the *I*. *I* perceive the sensation green, means, that the element green occurs in a given complex of other elements (sensations, memories). When *I* cease to perceive the sensation green, when *I* die, then the elements no longer occur in their customary, common way of association. That is all. Only an ideal mental-economical unity, not a real unity, has ceased to exist.

* * *

The ego is not an unchangeable, definite, sharply-defined unity. The important factor is not *unchangeability*, not determinate *distinguishability* from other things, and not accurate *limitation*; for all these factors even vary within the sphere of individual life itself, and their alteration is even *sought* by the individual. *Continuity* alone is important. This view admirably accords with that to which Weismann recently attained by biological investigations ("Regarding the Immortality of Unicellular Beings," *Biolog. Centralbl.*, Vol. IV, Nos. 21, 22; compare especially pp. 654 and 655, where the division of the individual into two *equal* halves is spoken of). But this continuity is only a *means* to dispose and to assure the content of the ego. This *content* and not the *ego* is the principal thing. But

this content is not confined to the individual. With the exception of insignificant, valueless, personal memories or reminiscences, it remains preserved in *others* even after the death of the individual. The *ego* is unsavable. It is partly the discernment of this fact, partly the fear of the same, that leads to the most extravagant pessimistic and optimistic, religious and philosophical absurdities. We shall not be able in the long run to close our eyes to this simple truth, the immediate result of psychological analysis. We shall then no longer place so high a value upon the ego which even during individual life greatly changes, and which, indeed, in sleep or during absorption in some conception or in some thought, just in our happiest moments, may be partially or wholly absent. We shall then gladly renounce individual immortality, and shall not place more value upon the accessory elements than upon the principal. We shall in this way arrive at a freer and a *more enlightened* conception of life, which will exclude the neglect of other egos and the over-estimation of our own.

* * *

If, now, the knowledge of the connection of the elements (sensations) does not suffice us, and we must ask *Who, What*, possesses this connection of sensations, *Who, What*, perceives sensations? we have succumbed, we may be sure, to our old habit of arranging every element (every sensation) within some *unanalysed* complex, and we are falling back imperceptibly to an older, lower, and more limited point of view.

* * *

The habit of treating the unanalysed ego-complex as an indivisible unity is often scientifically presented in peculiar ways. First, the nervous system is separated from the body as the seat of sensations. In the nervous system again the brain is selected as fitted for the performance of this function, and finally, to save the pretended psychical *unity*, a further *point* is sought in the brain as the seat of the soul. But rough conceptions like these are hardly adapted to trace out even in the crudest lines the ways that future research will follow in investigating the connection of the physical and the psychical. The fact that the different organs of sensation and memory

are physically *connected* with one another, and can be easily *excited* by one another is probably the foundation of the "psychical unity."

I once heard the question seriously discussed of "How the percept of a very large tree found room in the little head of a man?" Now though this "problem" does not exist, yet we perceive by the question the absurdity that is so easily committed in conceiving sensations to exist spacially in the brain. When I speak of the sensations of *another* person, these sensations of course present no activity in my optical space or my physical space generally; they are mentally added, and I conceive them to be *causally* annexed, not spacially, to the brain observed or represented. When I speak of *my* sensations, these sensations do not exist spacially in my head, but rather my "head" *shares* with them the same spacial field, as was explained above (compare what was said regarding the cut).

* * *

Let there be no mention of the so-called unity of consciousness. Since the apparent opposition of the *real* and the *perceived* world exists only in the mode according to which it is viewed, and no real chasm exists, a multiplex interconnected content of consciousness is in no respect more difficult to understand than the multiplex interconnection of the world.

If we are determined to regard the ego as an actual unity, we cannot extricate ourselves from the following dilemma: either to set over against it—viz., the ego—the world of incognisable substances (which would be wholly idle and purposeless), or to regard the whole world, the egos of other people included, as only contained in our own ego (to which, seriously, we could hardly make up our minds).

But if we take the ego merely as a *practical* unity, composed for purposes of provisional survey; in fact, take it as a more strongly coherent group of elements, which is less strongly connected with other groups of this kind; questions like these will not arise and research will have a free outlook.

In his philosophical notes Lichtenberg says: "We become conscious of certain ideas that are not dependent upon us; and there are other ideas that, at least as we think, are dependent upon

us. Where is the border-line? We know only the existence of our sensations, percepts, and thoughts. We should say, *It thinks*, just as we say, *It lightens*. It is going too far to say *cogito*, when we translate it by *I think*. Assuming the *I*, postulating it, is merely practical necessity." Though the method by which Lichtenberg arrives at this result is somewhat different from our own, we must nevertheless give our assent to the conclusion itself.

XII.

Bodies do not produce sensations, but complexes of sensations (complexes of elements) form bodies. If bodies appear to the physicist as that which is permanent, that which is real, and sensations as their evanescent transitory semblance, the physicist forgets that all bodies are but thought-symbols for complexes of sensation (complexes of elements). The *elements* designated also form here the real, immediate, and ultimate foundation which physiological research has now further to investigate. Through the discernment of this, many things in psychology and physics assume more distinct and economical forms, and many imagined problems are disposed of.

The world therefore does not consist for us of mysterious substances, which through their interaction with another equally mysterious substance, the ego, produce sensations as solely accessible. Colors, sounds, spaces, times, . . . are for us the ultimate elements, whose given connection it is our task to investigate. In this investigation we dare not allow ourselves to be hindered by the composites and circumscriptions (body, ego, matter, mind . . .) that have been formed for especial, practical, provisional, and limited purposes. On the contrary, the appropriate and best adapted forms of thought must arise within research itself, as happens in every special science. In the place of the traditional instinctive conception must come a freer, fresher view, conforming with developed experience.

* * *

I have always felt it as a special good fortune, that early in my life, at about the age of 15, I came across in the library of my

father Kant's "Prolegomena to Any Future Metaphysic." The book made at that time a powerful, ineffaceable impression upon me, that I never afterwards experienced to the same degree in any of my philosophical reading. Some two or three years later I suddenly discovered the superfluous rôle that "the thing in itself" plays. On a bright summer day under the open heavens the world together with my ego all at once appeared to me as *one* coherent mass of sensations, but in the ego more strongly coherent. Although the actual working out of this thought did not occur until a later time, yet this moment became decisive for my whole view.

Moreover I had still to struggle long and hard before I was able to retain, in my own special department, the conception I had acquired. With what is valuable in physical doctrines we necessarily absorb a good dose of false metaphysics, which it is very difficult to separate from that which must be preserved, especially where these doctrines have become current and familiar. So, too, the traditional, instinctive conceptions often arose with great power and placed impediments in my way. Only by alternate studies in physics and the physiology of the senses and by historico-physical investigations, since about 1863, after having endeavored in vain to settle the conflict by a physico-psychological monadology, did I acquire in my views any considerable firmness. I make no pretensions to the title of philosopher. I only wish to adopt in physics a point of view that need not be instantly changed the moment our glance is carried into the domain of another science ; since indeed, ultimately, all must form one whole. The molecular physics of to-day does certainly *not* meet this demand. What I say I have probably not been the *first* to say. I also do not wish to hold forth this exposition of mine as a special performance. It is rather my belief that every one will collaterally adopt the same view, who in a reflective manner holds survey in any province of science that is not too limited.*

* I have recently (1886) propounded these views in a pamphlet *Beiträge zur Analyse der Empfindungen*. Avenarius, with whom I recently became acquainted, approaches my point of view (*Philosophie als Denken der Welt nach dem Princip des kleinsten Kraftmasses*, 1876). Hering, too, in his treatise upon Memory (*Almanach*

XIII.

Science always arises through a process of adaptation of thoughts to a certain department of experience. The results of this process are thought-elements, which represent the entire department. The result, of course, is different according to the character and extent of the province surveyed. If the province of experience in question is extended, or if several provinces hitherto separated become united, the traditional, familiar thought-elements no longer suffice for the province thus extended. In the struggle of acquired habit with the effort after adaptation, *problems* arise, which disappear when the adaptation is completed, to give way to others that have sprung up in the mean time.

To the physicist, pure and simple, the idea of a body facilitates the acquisition of a comprehensive survey in his department, and does not operate as a disturbance. So, also, the person that pursues purely practical ends, is materially assisted by the concept of of the *I* or Ego. For, unquestionably, every form of thought that has been voluntarily or involuntarily constructed for some especial purpose, possesses for that particular purpose a *permanent* value. As soon, however, as physics and physiology touch, the ideas held in the one domain are discovered to be untenable in the other. From the striving after an adaptation of the one to the other arise the various atomic and monad theories—which are unsuccessful, however, in the attainment of their object. If we regard *sensations*, taken in the sense above defined, as *world-elements* or elements of the All, the problems referred to are practically removed, and the *first* and most important adaptation therefore effected. This basal notion (without any pretension to being a philosophy for all eternity) can at present be adhered to with respect to all provinces

der Wiener Akademie, 1870, p. 258; also published in Nos. 6 and 7 of *The Open Court*), and J. Popper in his beautiful book, "The Right to Live and the Duty to Die" (Leipsic 1878, p. 62), have advanced similar thoughts. Compare also my paper *Ueber die ökonomische Natur der physikalischen Forschung* (*Almanach der Wiener Akademie*, 1882, p. 179, note). Finally let me also refer here to the introduction to W. Preyer's *Keine Empfindungslehre*, and to Riehl's *Freiburger Antrittsrede*, p. 14. I should probably have to cite much additional matter that is in some way related to my line of thought if I possessed a more extensive bibliographical knowledge.

of experience ; it is consequently the one that accommodates itself with the least expenditure, that is, more economically than any other, to the present *temporary state of collective science*. Moreover, in the consciousness of its purely economical office, this basal notion acts with most perfect tolerance. It does not obtrude itself into provinces in which the current conceptions are still adequate. It will ever be ready, upon subsequent extensions of the domain of experience, to give way to a better one.

The philosophical point of view of the average man—if that term may be applied to the naïve realism of the ordinary individual—has a claim to the highest consideration. It has arisen in the progress of immeasurable time without the purposed assistance of man. It is a product of nature, and is preserved and sustained by nature. Everything that philosophy has accomplished—the *biological* title of every advance, nay of every error, admitted—is, compared with *it*, but an insignificant and ephemeral product of art. And in reality, we see every thinker, every philosopher, the moment he is forced away from his one-sided intellectual occupation by some practical necessity, immediately fall back upon the universal point of view that all men hold in common.

We seek by no means to discredit this point of view. The task that we have set ourselves is simply to show *why* and to what *purpose* for the greatest part of our life we occupy this point of view, and *why* and for what *purpose* we are provisorily obliged to abandon it. No point of view has an absolute *permanent* validity. Each has an importance but for some one given end.

ERNST MACH.